

## **Durability of plain and blended cements in marine environments**

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**Abstract:** This study was conducted to investigate the durability of two plain cements (Type I and Type V) and three blended cements prepared with fly ash (FA), silica fume (SF) and blast furnace slag (BFS), in marine environments. Cement paste, mortar and reinforced concrete specimens were exposed to sea water for a period of 2 years. In addition to inspecting the specimens visually, the performance of both plain and blended cements was evaluated by measuring the strength development, reduction in compressive strength, expansion, weight change, reinforcement corrosion and conducting chemical and mineralogical analyses. The visual inspection and compressive strength results indicated that the sulphate attack was somewhat hindered in plain and blended cements despite the high sulphate concentration in the marine environments. The data on reinforcement corrosion confirmed the superior performance of silica fume cement in sea water, followed by blast furnace slag and fly ash cements. The corrosion resistance of Type I cement was marginally better than that of Type V cement. Even though the Cl<sup>-</sup> concentration and Cl<sup>-</sup>/OH<sup>-</sup> ratio in the SF and BFS cements were the highest and much more than the threshold values, the intensity of reinforcement corrosion in these cements was less than that in the plain cements.